"I hereby declare that I have read this thesis and in my opinion, this thesis is sufficient in terms of scope and quality for the award of the degree of Bachelor of Electrical Engineering (Electronic) "

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Date : 11 MEI 2009

SPYCAM SURVEILLANCE SYSTEM WITH MOTION DETECTOR

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This thesis is submitted as partial fulfillment of the requirements for the award of the degree of Bachelor of Electrical Engineering (Electronic)

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MAY, 2009

"I declare that this thesis entitled "Spycam *Surveillance System with MotionDetector*" is the result of my own research except as cited in the references. All the trademark and copyrights use herein are property of their respective owner".

Signature : _____

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Date : _____11 MEI 2009_____

Specially dedicated to
My beloved family who have encouraged, guided and inspired me throughout my life

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ABSTRACT

Nowadays, Surveillance security system becomes the best solution to overcome more crime cases in our country and also for house intrusion problem, with the real-time monitoring it will be an effective security system. As we know, there are many types surveillance security system has today which are too expensive and difficult to use such as for Closed-circuit television (CCTV) surveillance system, with their centralized processing in compression and recording architecture together with a simple multi-monitor visualization of the raw video streams bear several drawbacks and limitations. For that reason, the Spycam Surveillance System with Motion Detector is built to perform automated capturing scene and provides immediate response to suspicious events by optimizing webcam capturing parameters. This project is focusing on developing a surveillance system with Passive Infared Detector as a motion sensor and webcam for capturing image, both of the devices become main component in cotroling the whole system. This project has utilized Visual C++ language and its component in creating the Graphical User Interface to interfacing the hardware and the computer. There also use parallel port for computer to interact to other external device. In this project it used to interface with PIR Detector. The project which has been successfully designed with the output is images from webcam and sensor to detect any movement while the camera continues to monitor the entire scene. Hopefully this project can function to adequate surveillance system for any crucial cases.

ABSTRAK

Pada masa sekarang, Pengawasan sistem perlindungan menjadi penyelesaian terbaik bagi mengatasi kebanyakan kes jenayah di negara kita dan juga masaalah pencerobohan di rumah, dengan masa pengawasan yang nyata menjadikan ia sistem perlindungan yang berkesan. Sebagaimana yang kita ketahui dewasa ini terdapat banyak Pengawasan Sistem perlidungan yang terlalu mahal dan sukar untuk digunakan seperti pengawasan sistem kamera litar tertutup yang mana memusatkan proses dalam memadatkan dan mencatat reka bentuk bersama dengan pengawasan mudah yang pelbagai memberi gambaran terhadap laluan video yang kasar menghasilkan beberapa kekurangan dan keterbatasan. Di sebabkan itu, kamera pengintip sistem pengawasan beserta alat pengesan pergerakan di bangunkan untuk mengambil gambar tempat kejadian dan reaksi yang cepat terhadap kejadian yang mencurigakan dengan mengoptimakan penggunaan kamera paparan gambar.Projek ini mengfokuskan kepada membangunkan satu sistem pengawasan dengan alat pengesan pasif Infa-merah sebagai pengesan pergerakan dan kamera paparan gambar untuk menangkap gambar, kedua-dua alat tersebut menjadi bahagian penting kepada keseluruhan sistem.Projek ini menggunakan bahasa Visual C++ dan alat-alatannya untuk menghasilkan gambarajah menghubungkan pengguna kepada komponen dan computer.Disini juga menggunakan pangkalan selari untuk komputer mengpengaruhi alatan luar. Untuk projek ini ia telah digunakan untuk menghubungkan PIR Detector.Pojek ini telah berjaya menghasilkan gambar daripada webcam dan sensor untuk mengesan sebarang pergerakan sementara webcam sentiasa mengawasi seluruh kawasan.Diharapkan projek ini dapat berfungsi sebaik mngkin terhadap sistem pengawasan kepada banyak kes yang penting.

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LIST OF ABBREVIATION

PIR	-	Passive Infared
CCTV	-	Closed-Circuit Television
USB	-	Universal Serial Bus
PC	-	Personal Computer
GUI	-	Graphical User Interface
GND	-	Ground
N.C	-	Normally Close
N.0	-	Normally Open
VGA	-	Video Graphics Array
LCD	-	Liquid Crystal Display
LED	-	Light Emitting Diodes
BIOS	-	Basic Input/Output System
IDE	-	Integrated Development Environment
MSVC	-	Microsoft Visual C++
MFC	-	Microsoft Foundation Classes

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CHAPTER 1

INTRODUCTION

1.1 Introduction

In the last several years, more of the crime cases still in investigation even there have advanced surveillance system where there are better in tackle rising crime theft rates in the world. The surveillance system still has major shorcomings in the ability of most solutions to provide the sort of prevention and investigative capabilities security organizations need.

This project try to find out the problem with the surveillance system in competitively priced appliance designed. This surveillance system is one of effectiveness security system in protect any suspicious occur and also as a safeguard at home or public.

This security system applies simple demonstration of the parallel Interface that is available for users to communicate with external circuitry or any hardware devices. For this project, this application have been develop with parallel port interfacing with motion detector and USB webcam by using Mcrosoft Visual Studio software and Visual c++.

Webcam will capture image that detected by motion detector and save that image through the hard disk in the computer.

1.2 Project Objective

The purpose of this project is to design security system using motion detector. The sensors are use give the system the ability to detect the condition around the vincinity. If any motion occurs the sensor will active and webcam will be able to capturing image. To achieve this purpose, the project is carried out for the following objectives.

i. To develop security system utilizing PIR Sensor that can communicate using parallel port
ii. To develop the Surveillance system with effective image storage which there are store through the hard disk in computer
iii. To design Graphical User Interface using Microsoft Visual C++ that easy to control.

1.3 Project Scope

To ensure the project running smoothly a few scope have listed as a guide to make sure the objectives of project achive. There are three scopes are discussed in the following paragraph.

First scope of this project is to interface hardware with parallel port. In order to control electrical appliances using PC it find that parallel port is one of the easiest pieces of hardware available to users for communicating, this surveillance system applly for motion sensor to communicate between ports with a few requirements for control application using software. This objective make sure motion detector will be use through parallel port and it function clearly.

Second scope is for user easy to control, it able to create and design GUI in Microsoft Visual Studio using Visual langguage C++. The design in GUI must be user-friendly to make the user understand to use it. For control user just needs to run the program and can check the status of port used, if motion have the port will change automaticly and image will continuos capture as long as motion running and save to location had set in the program.

Lastly, to develop the system with maximum effective storage, the system use hard disk in computer as place to store the image taken by webcam, their will be greater storage capabilities much than use memory card or video tape like other surveillance system.

1.4 Problem statements

In the last 10 years, the security industry has seen huge improvement in its ability to amass Surveillance information. Bigger budgets, cheaper cameras, and cheaper storage have resulted in bigger and better surveillance system – 30 million security cameras generate 4 billions hours of video every week in the United States alone [1]. But despite these huge increases in CCTV spending, there has been litle to no reduction of fraud, theft, crime, and terror. Conventional surveillance systems haven't made human beings any faster at watching all that video, understanding its content and finding critical information.

Some of there are too expensive or impractical just for home use and not applicable for many situations. This "Security Gap" between what we collect and what we can analyze is at the root the most pressing problems in surveillance system today. [1]

For that reason, the Spycam Surveillance System with Motion Detector is built to perform adequate surveillance security system in order to prevent any crucial crime with automated capturing scene and provides immediate response to suspicious events. This system also built with motion detector to detect movement in detection zone, without motion detector the system need to run continuously and 24-hours on without effective storage and will loss more energy.

1.5 Thesis Outline

The thesis consists of five chapters all together including this chapter. The contens of each chapter are outlined as follows.

Chapter one contains a details description about the overview, objectives, scopes and problem statement that finding in the project development.

Chapter two discusses the detail of literature review, which is applied in the whole project. These literature review, are selected from books, journal and articles. This chapter will discuss about the Microsoft Visual Studio and its component, Parallel Port and how to communicate with it, types of motion sensor which are Passive InfraRed Detector and Ultrasonic Motion Sensor also discuss about QuickCam Pro 5000 type of webcam that have been used to impliment in this project.

Chapter three explains the methodology and the system block diagram used. This chapter divided into two parts, first for hardware interface and second for software interface, in hardware interface there will be discuss about connection sensor with parallel port. For software interface there will mention details on how the programm running in each part.

Chapter four discusses the result obtained from the project. There are two types of result, result for hardware and result for software.

Chapter five is the conclusion in finishing this project. This chapter also includes suggestion for future development, cost and commercialazation.

CHAPTER 2

LITERATURE REVIEW

2.1 Introductions

The purpose of this chapter is to give an overview of state of knowledge on the security system. It is important to know further detail of motion sensor, webcam, types of security system and some example of implementation of security system have used.

There are still other supported devices such parallel port. This will be use to commnicate with motion sensor. The port is composed of 4 control lines, 5 status lines and 8 data lines. It's found commonly on the back of your PC as a D-Type 25 Pin female connector. There may also be a D-Type 25 pin male connector. This will be a serial RS-232 port and thus, is a totally incompatible port.

Other supported device will be used are Passive Infared Sensor, this sensor is good at detecting movement within its range at a relatively low cost and low power consumption. The infared sensor will be use in detecting movement moving in the house or places that implement security system. The range of the sensor is about 1.5 meters.

For further information on the component and concept that will be used is explain in this chapter.

2.2 Motion Sensor

Motion detectors are widely used in security system. It contains a motion sensor either integrated with or connected to other devices that alert the user of pre-sense of motion. It typically positioned near exterior doorways or windows of building to monitor the area around it. Since motion detector are so flexible and have so many uses, it offer for protection and security the average homeowner as well as commercial organizations [7].

An electronic motion detector is a device used to detect any physical movement in a given area and transform motion into electric signal. It consist of sensor that electrically connected to other device such as security system, lighting, audio alarm and other application. Motion sensors are used in a wide variety of applications and as a result, there are different types of motion sensors are available. For this chapter it only details for PIR sensor and Ultrasonic sensor, figure 2.1 are examples for both sensors.

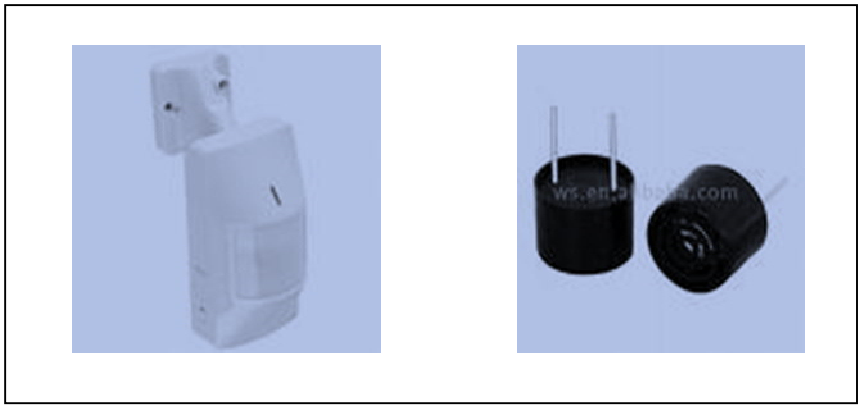

Figure 2.1: (a) PIR sensor, (b) Ultrasonic motion

2.2.1 Passive Infrared Detector

PIR stands for Passive Infrared. In simple terms, it is a motion detector. PIR motion detectors are the most frequently used home security device. It usually designed to provide an indication to an alarm panel in response to detecting IR that is indicative of motion of the object. The alarm panel is responsive to receipt of the breach indication to cause an alarm condition occur.

Excellent performance infrared sensor for use in alarm burglar systems, visitor presence monitoring, light switches and robots This sensors measure infrared radiation emanating from objects in the field of view. It have two pin temper for 24hours N.C. loop of control panel, two alarm pin for input of control panel (N.C/N.O) and another two pins is connected to 9V-12V and GND separately as shown in figure 2.2.

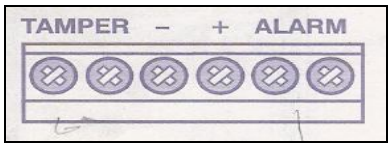

Figure 2.2: Terminals in PIR Detector

Apparent motion is detected when an infrared emitting source with one temperature, such as human body, passes in front of source with another temperature, such as wall [5]. The unit output is high whenever there is motion detected. If the motion is continuous, the output remains high. After motion stops, the output remains high for a few seconds depend on pulse given, for this sensor the pulse count can be set to count 2 or 3 pulses by placing the jumper head on the corresponding pins as shown in figure 2.3. An alarm signal will only be sent when the selected pulses are generated within delay 20 seconds. When motion is detected a subsequent pulse signal will override the pulse count setting and generate the alarm signal without any delay.

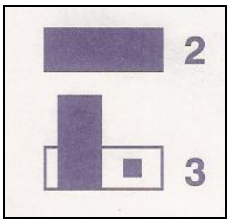

Figure 2.3: The pulse counter

For this sensor the detection pattern cover as shown in figure 2.4 below

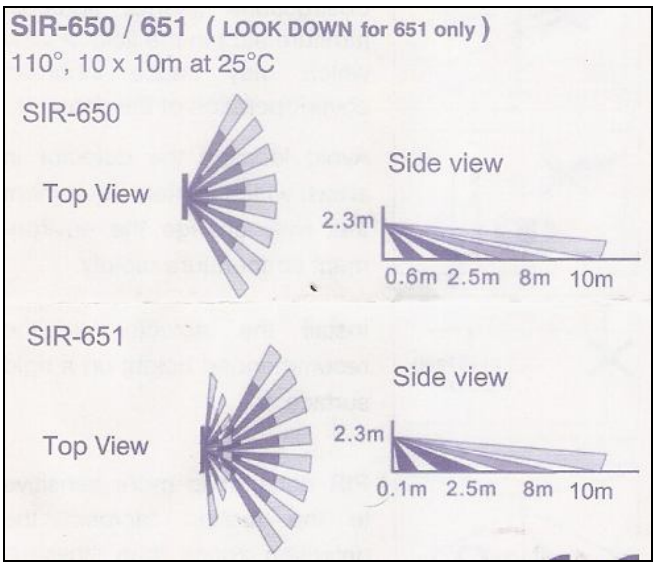

Figure 2.4: Detection Pattern

2.2.2 Ultrasonic Motion Sensor

The other motion detector used in security system is an ultrasonic motion detector. It is commonly used for automatic door openers and security alarm it can

operate with narrow beam-widths and detect motion in area where there are not supposed to be any moving object.

In an ultrasonic motion detector, there are two transducers, one emits an ultrasonic wave and the other picks up reflection from the different object in the area. The reflect wave arrive at receiver in constant phase if none of the object in the area ar moving. If something moves, the received signal is shifted in phase. A phase comparator detects the shifted phase and sends a triggering pulse to alarm.

Ultrasonic motion detectors have certain advantages and disadvantages when compared with other types of motion detectors. The main advantages are that they are very sensitive and extremely fast acting. However, the largest problem with type of motion detector is that it sometimes responds to normal environmental vibration that can be caused by a passing car or a plane overhead. The installation options on this type of motion detector are limited because ultrasonic beams are easily blocked by thin materials, including paper. False triggering is easily caused by reflections from blowing curtains, pets, and flying insects [6].

For that reason, the purpose of using PIR sensor to detect motion for this project is surely on the advantage offers by the sensor. Its capability on detecting motion with simple design at lowest cost needed to build an effective house security system base on motion detection.